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A Proposed Knowledge Management Cycle for University Organizations

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Abstract

The topics of organizational learning and knowledge management have recently gained considerable attention in business settings. On the other hand, little attention has been paid to how such concepts can benefit higher education with universities often seemingly grasping firmly to a pre information revolution paradigm. This paper introduces a model of knowledge management and creation that can be implemented by teams of students and faculty members in a University setting. The model includes three entities: the research engine, the development engine and the learning engine. Here we will introduce each and explain how the three interact in the knowledge creation cycle.

Introduction

Knowledge is increasingly recognized as a strategically significant resource of the firm and a critical source of competitive advantage (Grant 1996, Prusak 1996). While individuals create knowledge, organizations play a critical role in stimulating knowledge creation, articulating and codifying such knowledge and cultivating a culture of knowledge augmentation and sharing (Nonaka 1994). Companies recognize that knowledge and experience held by their employees can be leveraged to better serve target markets. Universities have long recognized the value of the expertise of their principal employees - the faculty - but we believe that notions of knowledge management can also be applied to the student membership of the University community. Lately, higher education institutions have faced strong criticism for not being able to provide students with critical thinking skills, quantitative reasoning skills and the ability to find needed information independently (Twigg, 1994). Colleges are faulted for not providing just-in-time, as opposed to just-in-case, education (Ives and Jarvenpaa, 1996). Others criticize, universities as lagging dramatically behind in the information revolution. (Leidner and Jarvenpaa, 1995; Alavi, Wheeler and Valacich, 1995).

Here we present a conceptual model of knowledge management inspired by Nonaka's "hypertext organization." The "hypertext organization" is one provided with "... a strategic ability to acquire, create, exploit, and accumulate new knowledge continuously and repeatedly in a circular process (Nonaka, 1994, pp. 32). We have developed and implemented such a concept with student and faculty teams. We believe that our model addresses some of the problems afflicting institutions of higher education, while providing a framework to help leverage the capabilities of faculty and students and manage the wealth of information they create and use. Our model, through the use of information technology, benefits the organization and its participants by harnessing the unique talents and expertise of those participants and, in so doing, creates a culture of knowledge creation and diffusion. We also believe that the model has the potential to help students develop the ability to learn at a "higher level" (i.e., learn to learn) and help universities face the many challenges posed by the rapidly evolving environment of higher education.

The Conceptual Model

It is our contention that the model proposed in this paper offers the structure to implement a Hypertext Organization in a University setting. The major objective of the proposed model is to create an explicit and structured process that can foster individual as well as organizational learning while simultaneously adding to "organizational memory". In other words, we intend to create a repository of knowledge accessible to all the people in the organization on a just-in-time basis, and to create a culture of anytime, anywhere knowledge creation and sharing (Chen, Ives and Leleux, 1997).

Figure 1 depicts a representation of the model and the connection between the three entities, or *engines*, involved in the knowledge creation and utilization process. Faculty and researchers in the *research engine* provide guidance and set goals for the organization. Graduate students in the *development engine*, under supervision of the research engine, produce and codify knowledge material. Finally, students in the *learning engine*, under faculty direction, utilize the stored knowledge. Information technology enables this reengineered process. The Internet, and the World Wide Web in particular, facilitates efficient and effective exchange of the knowledge created; thereby providing a distribution channel for "cumulative knowledge building". Our model focuses on the use of information technology, but also emphasizes the importance of the human factor and the motivation and reward systems that encourage knowledge sharing and knowledge building.

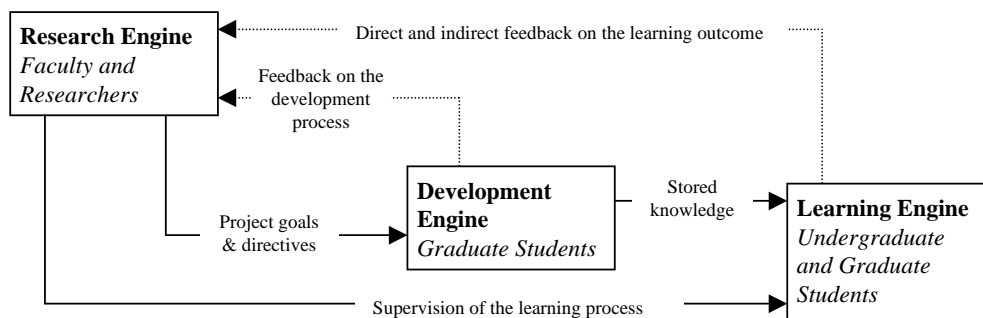


Figure 1. The Proposed Knowledge Management Model.

Dotted lines represent feedback loops.

The proposed scheme is intended to provide tangible benefits for all parties involved in the process and to reward them for their participation. The model also offers the ability to influence the organizational culture so as to drive it towards increased sharing, reliance on the contributions of others, and decentralization of knowledge ownership. The absence of such a culture is often seen as a major problem

for organizations. According to Davenport and Prusak: "... the best firms of the future will be those in which everyone creates, shares, and uses knowledge instead of hoarding it." (McConville, 1998)

The research engine, staffed largely by faculty and Ph.D. students, initiates the knowledge development cycle. The major contributions of the research engine are:

- Identify concepts and subjects to explore
- Identify theories and hypotheses to formalize the exploration
- Operationalize these theories and hypotheses in development projects
- Establish guidelines and provide direction for learning and development
- Assess the veracity of the hypotheses
- Ensure the quality of the final product

Through research and analysis of the environment, new technologies, and job market requirements, researchers specify learning objectives and development requirements for the students involved in the development phase as well as the individual hypotheses to be tested and research methodologies to be employed. This research and analysis stage aims to guarantee that the development projects, designed by the research engine, are integrated with class material and concepts covered during the course and are not perceived by the students as a separate, "make work" activity. The research engine must lead and facilitate the discovery and knowledge creation journey of the students and ensure that knowledge already created and stored in the system is understood and utilized by the developers to make the process a continuing and incremental one. An appropriate reward system must be created to encourage good quality. The grade is the obvious incentive for students, but in implementing the model we have also experimented with a peer quality assurance system.

The research engine provides input and guidance to the development engine that will create the knowledge material. The contributions of the development engine are:

- Research the content areas of the knowledge modules to be developed
- Acquire the technical skills for development
- Generate the product

Under the guidance of the research engine and a project manager or instructor, the developers research, assimilate, and gain expertise in the topics and concepts assigned to them. Through this individual or group discovery and research process the students are to achieve higher level learning skills and the ability to produce high quality independent or collaborative work. Throughout the development phase, the students are also required to acquire the technical skills necessary to capture and store the information and the knowledge produced. Finally, the students are responsible for augmenting the knowledge repository with a product of standard format and high quality that can then be utilized by the learning engine.

The learning engine utilizes the stored knowledge either under the guidance of faculty, or independently in a self-paced learning environment. Classes need to be designed to leverage the stored knowledge and to be attentive to the feedback generated, through expressed and hidden cues, by the students.

As shown in Figure 1, feedback loops intervene between the development engine and the research engine. The research engine is directly involved, as a guide and facilitator, in the development process. During the development phase, the research engine receives feedback regarding the knowledge acquisition and development as well as mastering of skills and higher level learning by students/developers. This feedback allows the research engine to revise and adjust the theoretical framework and hypothesis underling the development and teaching efforts.

The research engine is also directly involved in the teaching phase and monitors the progress of the students in the learning engine and the outcome of the learning process. The feedback obtained during this monitoring process is employed to revise and improve the direction and guidelines provided to the development engine.

Crucial to the success of the proposed scheme is the reward system. To students involved in the development phase, reward comes in the form of new skills and concepts as well as credit received for the development project. To faculty and students

in the research engine, the reward comes in the form of project development, possible publications, and an enriched teaching environment.

Preliminary Observations from the First Implementation

In the summer semester 1997, graduate students enrolled in the introductory MIS course at a large University in the United States, where involved in the first large-scale development effort. Under the guidance of one faculty member, a Ph.D. student and two graduate assistants, 70 students developed on-line learning modules for Microsoft Office 97.

The project was presented as a Distributed Software Development (DSD) project, which allowed the faculty member to introduce a number of concepts and skills relating to the course objectives (available from the authors upon request). The class was split in two groups. One half of the participants worked on the project as individuals, while the second half were assigned to teams. A total of 138 teaching modules were developed based on a boilerplate document prepared in advance by the Ph.D. student. The workload, per student, was approximately the same for individual versus team participant.

A quality assurance process was also integrated into the scheme. Individual students or groups of students were assigned to perform quality assurance on the work of other individuals or teams. A form was devised that requested identification of errors in formatting, content, potential copyright violations, bad links, inconsistencies with the boilerplate, lack of use of relative addressing, and so on

As this early work was exploratory in nature we did not formalize our tests of hypotheses. Still, student evaluations and a post study debriefing of the research team did provide us with valuable insights in crafting future knowledge cycles. Among these are the following:

- Establish strong leadership early in the project development phase.
- Integrate the lecture material and course objectives with the development projects.
- Understand the reward system and provide adequate incentive for the developers.
- If a quality assurance scheme is implemented, make the process systematic using strict directions and standard forms to record errors and deviance from the original design.
- For large-scale projects, expect a certain degree of wording and format inconsistency of the product. To partially mitigate the problem, provide constant feedback and expose developers to the work of others early on.

Conclusion

In this paper we present a model of knowledge management that can be implemented with faculty and students in a University setting. The model is proposed to help institutions of higher education realize the importance of knowledge management and the contribution of students, as well as faculty, to the knowledge creation process. The process that we introduce is based on the complementary contributions to the overall organizational knowledge base of three entities: the research engine, the development engine and the learning engine. We argue that the process described, through the enabling effect of the World Wide Web, can be successfully realized because it provides tangible rewards for all the individuals involved.

References

- Alavi, M. , Wheeler, B.C and Valacich, J.S. "Using IT to Reengineer Business Education: An Exploratory Investigation of Collaborative Telelearning," *MIS Quarterly* (19:3), September 1995.
- Chen, Y.S., Ives, B. and Leleux, D. "Information Systems Knowledge Repository: A Structure For Electronic Scholarship," Proceedings of the Third Americas Conference on Information Systems, Indianapolis, 1997.
- Grant, M.R. "Prospering in Dynamically-Competitive Environments: Organizational Capability as Knowledge Integration" *Organization Science* (7:4), July-August 1996.
- Ives, B. and Jarvenpaa, S.L. "Will the Internet Revolutionize Business Education and Research?" *Sloan Management Review* (37:3), Spring 1996.
- Leidner, D.E. and Jarvenpaa, S.L. "The Use of Information Technology to Enhance Management School Education: A Theoretical View," *MIS Quarterly* (19:3), September 1995.
- McConville, S. "An Interview with Tom Davenport and Larry Prusak, Co-authors of Working Knowledge: How Organizations Manage What They Know" (on-line) available 2/27/1998 http://www.hbsp.harvard.edu/workingknowledge/wk_qa.html
- Nonaka, I. "A Dynamic Theory of Organizational Knowledge Creation," *Organization Science* (5:1), February 1994.
- Prusak, L. "The Knowledge Advantage. (knowledge management in organization)," *Strategy & Leadership* (24:2), March-April 1996.
- Twigg, C.A. "The Changing Definition of Learning," *Educom Review* (29:4), April 1994.